to be a business imperative. And some of these numbers, as you can see up here, are eye openers. A huge number, one out of five people with disabilities, and disposable income, and the trillion level.

And baby boomers now turning 50 every seven seconds, and people losing their hearing now at 50. So these are just purely to say is this going to be enough to make it a business imperative?

We'll find out. I know this panel is about barriers. But I guess when I think about this I see it more in terms of opportunities. Although our question is, you know, how we are going to make it happen.

A lot of people have already talked about redundancy. And from my perspective redundancy is the basis of access. And Voice Over IP really offers that.

But can we get there quickly enough? I am very concerned. You know, they are predicting 50 percent of businesses will be using VoIP by 2006, and about 40 percent of all U.S. phones by 2009.

You know, are we going to get there quickly enough even though there are a lot of opportunities? Some of the other opportunities are already happening now with several hard-of-hearing people using some of

these upstart telephone company services.

Getting for 15 dollars a month just about every bell and whistle that you can possibly think about. So, the other attraction for some people, assuming they have access to broadband of course, is that it can provide them with fairly affordable services.

I thought one of the things to talk about -- the barriers -- would be to also tell you some of the things that people who are hard-of-hearing need. And, you know, we have talked a lot about mobile services, mobile focus, which is really important.

But what about using it in your home? Several other things that need to be connected with that whole system to make it work, the hardware. And we are running in with, people who are hard-of-hearing are running into a lot of problems with that.

But anyway, let's looks at some of the features. Some of these are already available. And the question is we don't want to lose them. And some of them are more like a wish-list, but we believe could be possible, because of the opportunities that Voice Over IP offers.

So we are talking basic things like clear, strong, high quality signal for speech and tele-coil.

It is very important for hard-of-hearing people.

Adequate volume control, and this is a lot of times on the hardware piece of it. Adequate volume control easily manipulated. Tele-coil compatibility without interference for people using it with their cochlear implants and their hearing aids.

Simultaneous voice and text display, we have that now with their preferred relay, which is captioned. Are we going to be able to keep that? We don't know.

From what I'm hearing, if it's compatible with a fax we will be able to. But we don't know for sure. But we do want to keep that capability, because people hard of hearing can hear some of it.

But they want to be able to read at the same time, particularly older people. Now, I know these baby-boomers that are coming along. Also being able to output a jack with sufficient power to use assistive listening devices, neck loops, and such in the hardware piece of it.

High quality video just around the mouth, 30 frames a second, or faster, you know, just being able to have a piece of that video that will give you enough speed that speech reading will be accessible.

We have already talked about simultaneous

audio and video a lot. But also the ability to add text to voice calls. And it would stream in an incoming call.

Let's not forget about incoming calls. We are on a call, and we think we are doing okay, and all of a sudden we start to realize this is somebody we just cannot hear.

Can we then immediately bring in text to that call? That's very important for hard-of-hearing people. An ability to initiate three-way-calling both for incoming and outgoing calls, which at the moment is not something that can happen.

That should be. That's on our wish-list. But I think that could be something that we could hope for. We have talked a lot about emergency. I don't need to get into that.

The ability to connect and to relay into a call at any time, a call that is not a relay, but you want to bring it in to a call when you are suddenly running into problems.

And maybe, in terms of getting less error when you are looking at speech recognition in the future, to have less error, to enable hearing callers to use their own speech recognition on their end.

So each have their own speech recognition on

either end. So, I'm here talking a little bit more about existing hardware that's not accessible. Many people are setting up Voice Over IP.

And their preferred way seems to be to do it with extendible cordless phones. And right now, even though those phones are regulated, they are not in many times accessible, because they are starting to create interference because they have gone digital, if I put it like that.

So we are running into trouble with people finding that that's the best way to use Voice Over IP. But they can't because the hardware is not accessible. So what are we going to do about that?

And, you know, we have talked about whether or not there should be enforcement versus, you know, dangling a carrot. We already have laws in place. And one of the big barriers that we're facing right now is that they are not being strongly enough enforced.

And that is definitely going to impact hard-of-hearing people's ability to use Voice Over IP. So we really have to look at that very seriously. And then I think right now there's the whole uncertainty of where Voice Over IP actually fits in to the telecommunications structure.

Is it going to be regulated? You know, based on history, and this is being said over and over again, that really is the only way that we do get access.

And even then it is hard to make it happen, because of the enforcement situation, it's not always as effective as it should be or it might be. I think the issue here is that a decision needs to be made very quickly by the FCC about this, because Voice Over IP is rolling out extremely quickly, very fast.

And we are going to be -- I see us being in a situation that we've been in before where, you know, we are playing catch-up all over again because we just have missed the boat in terms of getting started quickly enough.

And there are leaders here, and companies that are obviously making efforts to make sure that they do have access in their systems. But what about all the other companies out there that are not represented here today, and are not as focused as these companies who are here today. Thank you.

DR. PEPPER: Thank you Brenda. Our next speaker is Barry Andrews, who is trained as an Engineer. And he is President of 8x8. 8x8 is a Voice Over IP service provider.

And so Barry is going to focus on the questions from the perspective of somebody who is actually providing Voice Over IP.

MR. ANDREWS: Thank you, I didn't get my slides in on time, so if anyone would like a copy, please send me an email or see me after the talk.

DR. PEPPER: They also will be posted on our website with the others.

MR. ANDREWS: Okay, great. The continuing rapid adoption of broadband internet access is one of the major factors that is driving the growing Voice Over IP market.

Services -- and by that I mean voice, video, and text -- can be delivered reliably and cost effectively over IP networks. There are challenges that are presented by IP-enabled services.

Some of these have been discussed already, and a number will be discussed in the 911 regulatory panel. Those include usability and accessibility. We want a service that's easy to use by all.

Quality, especially as it relates to video and the requirements for bandwidth, as well as video and audio sync. Interoperability, the joke is, you know, the nice thing about standards is there's so many to choose from.

But that doesn't help when you're trying to communicate with other vendors. And public service and safety, including such things as rural access. In my very brief talk today I'm going to attempt to do a demo of one such service called Packet 8 that our company offers.

It's an example today of a voice and video over IP. And because I'm worried about running out of time, I'm actually going to state my conclusion right now.

And that is voice, video, and text in a universal service over IP with global interoperability presents the opportunity to improve personal communication for everyone.

So, very quickly, Packet 8, a description, and then the demo. Packet 8 is an end-to-end voice, and/or video communication service that operates over the internet.

It allows calls to or from any phone in the world, including traditional telephones. And it uses regular telephone numbers currently assigned from the U.S.

It enables high quality voice and video calls dependant on your video bandwidth that you might have home or your office, or wherever. Subscribers

can choose the use of a traditional analog telephone to connect to the audio adapter, their computer, a cell phone, or a video phone to place calls.

It's extremely simple to install. It requires only the terminal adapter or video phone. Basically plug it in and have a dial tone. My two year old daughter can operate the video phone.

For her, you know, making a phone call means a video call. She's at that age she knows nothing else other than talking to daddy on the video phone. Set up is managed and billed via the internet.

This is perhaps a subset of the diagram that Gunnar was showing earlier in the first panel. Our service is also based on SIP. And I'm happy to say I have not talked to Gunnar at all.

But the set of protocols that we are using very closely matches what he described as the preferred setup protocols. Okay, so we will see if Murphy's law doesn't take effect.

So, this is the video phone. I think I have people here at the FCC that can vouch that, you know, they did no special configuration of their firewall. We basically just plugged it in.

DR. PEPPER: Can you give him the handheld mic or -- there we go.

MR. ANDREWS: So I'm calling a San Jose, California number. And actually I dialed the wrong number. But this is my daughter Janette at home. I sweetie, how are you doing.

She's my five year old. But the two year old is hiding somewhere there as well. She can use the video phone. Okay. Hi girls. I think they sense someone else is here.

Let me try another number. Okay, this one is different by one digit. Hello Richard. Richard is actually a former employee of 8x8 when we had our via-TV line of video phones.

And he was instrumental in enabling that device for text over a POTS video phone. These are similar type things that we are working on with the Packet 8 service today.

Hi Richard, how's the weather in California? Okay, so we are somewhat limited by the bandwidth here, but you can see that it does work today. This is real, this is something that's offered now.

Thank you, Richard, good-bye. Okay, I'm not sure where we are time-wise. I do have a little bit of time. And maybe I will just point out that I go into more detail on some of the usability requirements in the last two slides.

Of particular interest are things that are outside of our control as a service provider, are, for example, the bandwidth. DSL is typically you have a downstream of 384 Kbs per second or greater.

But the upstream is limited to 128. Video and audio over IP are symmetric in terms of their bandwidth requirements. The first call I made was actually to my home.

We have cable there. The upstream bandwidth there is better than DSL, it is 256. And, of course, the more the better. Gunnar mentioned H.263 is a very common and very well known video codec.

And there's actually a lot of activity within the ITU on enhanced video codec such as H.264. All right, I see I'm out of time. There is another slide here if anyone wants to read more. Thank you very much.

DR. PEPPER: Thank you. Our next speaker is Claude Stout. Claude has been a frequent participant here at the FCC in a variety of forms. He's currently Executive Director of Telecommunications for the deaf, TDI.

TDI is a national non-profit advocacy organization that promotes equal access to telecommunications and media for deaf people in the

United States, as well as people hard-of-hearing and deaf/blind.

Prior to TDI, Mr. Stout was the Assistant Director of Community Affairs with North Carolina Division of Services for the deaf and hard-of-hearing. Claude, I am very pleased to see you again. And we are looking forward to your presentation.

MR. STOUT: Thank you. It is good to see everyone here today. Brenda talked from the perspective of hard-of-hearing people in America. I am going to speak from the perspective of deaf, late-deafened, and deaf/blind Americans.

We in America who are late-deaf, and deaf, and deaf/blind get more encouraged by the advent of VoIP and the internet capable services throughout America.

And we are already enjoying some services in that arena. For example, right now we are enjoying internet relay services. I have to tell you we don't have to bother with our TTYs.

We just have our computer on our desk. We can put aside that TTY and just move forward using our computer. And it's just in a window on our computer. And we can move to relay service, video relay service, or a Microsoft Word document and transition between

those applications very seamlessly.

The other thing we enjoy using is the new video relay services that have been in existence for a short time now. And they are amazing for the community.

And I have to let you know that VRS is not an add-on service. It's not an added value service for us. It's really not. It is approaching functional equivalency for us more than any other service.

VRS allows me to use my native language to communicate with an interpreter through my computer and a webcam, and then communicate to a hearing person on the other end of the call.

And it goes quickly. The hearing person is going to be much more eager to receive phone calls for me because there's not delay that's experienced through a traditional relay call in the turn taking that's necessary there.

And as we experience these IP services, these basic services, we are now seeing that we are leaving the traditional services behind, that we are now ready to dive into the multimedia and to, you know, distance ourselves from using those traditional devices and services, and be able to use, you know,

the other multimedia services that are out there, like have been presented this morning.

There's a multimedia approach that can be used for audio text. Voice and video all integrated into one product that is very exciting for us. Please know that deaf people have been involved with advocacy for many years.

Some of us for 30 years. Some of us who have lived a long time have been in it for 40 or 50 years, you know. And we feel we have seen such great changes in access, and that more access will be granted as regulations and those things are developed that will help move the technology forward.

A lot of this effort has been by volunteers or by companies just out of the goodness of their hearts developing these products. And we encourage that voluntary participation from companies throughout the United States that have done that.

But in order to get more services for us to be able to see cost reductions and to be able to have, you know, more convenience and enjoy better customer care, we want to see a more diversity of services out there, more things developed in the IP arena for people with disabilities.

Broadband is now spreading across America.

But we need to have research and rules created that allow us to enjoy the most of broadband. Right now, as we have talked about with video services, sometimes we experience reduced frame rates that impede the quality.

Maybe in a workplace we can't make a call because of a firewall that's set up that doesn't allow a video call to be made. We need, you know, work-arounds to be set up that still maintain the security of the system for companies.

Many of us use computers in libraries and schools. And many of us in our community are poor and don't have computers at home. And we depend on support from universal services funds that allow us to have access to the technology that we do need.

Many of us, you know, have phone lines that cost a certain amount of money. We need to have a fee structure set up that will no longer rely on just the phone service fees only, but will allow IP fee structures to be incorporated there.

We are also looking at, you know, different economic situations, and educational situations, people that are very good in English, or other folks that because English is their second language they are not as strong in that language.

Other people who are underemployed because of their disability that don't have the money or the funds to be able to access the technology that gives them full access.

There's lots of areas where there seems to be a focus on the high-need areas. But there's also people that may seem to have a low need that still need access to this technology.

This IP technology, you know, shouldn't push us into another valley. But it should, as products are developed, and services are developed, it should lead us along with the rest of society in being able to take advantage of these products and services that are developed.

Technology means freedom for us. It enlarges and expands the playing field for us in employment, in education, in community, and other arenas in our lives.

I'd like to emphasize to the IP developers out there, the companies and the developers, that when you design and develop products and services please consider our needs, not just develop a great product and then say, oh, I forgot to meet the deaf and hard-of-hearing needs

And now what are we going to do with this?

We are going to have to reverse engineer or do an add-on or something. If you think of our needs first, don't assume those needs, ask us.

Definitely ask our needs. Ask people. Go out in the communities, ask people throughout the nation what their needs are and build them in from the ground level.

We applaud Gunnar and others like him who have, you know, encouraged the production of multimedia, audio, text, and video services all combined into one product so that we can have our everyday needs taken care of.

There's a variety of degrees of hearing loss out there. There's a variety of degrees of vision loss out there. And all of those needs need to be considered. Thank you very much.

DR. PEPPER: Thank you, Claude. Our next speaker is Jim Tobias. Jim is President of Inclusive Technologies, and is working with the field of technology and disabilities for about 25 years.

He currently is providing consulting services and telecommunications and disability, aging, and education. He was a member of the Access Board's Telecommunication Accessibility Advisory Committee responsible for drafting section 225 regulations.

And he's also an Alum of the FCC's first consumer disabilities technical advisory committee. So thank you very much Jim.

MR. TOBIAS: Thanks. I want to talk today about what I consider to be the worst functional limitation that could be imposed by the migration to Voice Over IP or IP-enabled services.

And that is in an information age not knowing is the worst disability, the worst functional limitation that a person can have. When we are offered a range of products that allow us to perform almost infinite combinations of services -- we've heard about voice and text, and video, and automatic translation -- we have to remember that a product with infinite functionality, has an infinitely long configuration system, with an infinite number of wizard screens that take an infinite amount of time to figure out which check box and which radio button do I implement here.

And this is not just a theoretical barrier. This is an actual barrier. If you look at the way to implement TTY compatibility on today's generation of cell phones, you find that it's rather deep in the menu.

How are consumers expected to find that

information? How deep down do they have to dive into the manual of an accessible mainstream product to find the feature that they need to turn on or turn off in order to make it work the way they need to?

So this profound lack of information appears as a barrier to individuals with disabilities. And we see this in the outcomes. And to answer Dane's question, which wasn't asked of this panel, but I will answer it anyway, what is the approach that the Commission by profitably take to address accessibility?

I would say an outcomes oriented approach, not an approach that says here are the regulations, and here is the lack of complaints, which indicates that there must be the right amount of compliance.

But what percentage of people with disabilities can access what reasonable market basket of services in the world of telecommunications given the combination of mainstream technologies and assistive technologies?

Are we actually showing an improvement in people's live and abilities to communicate in this information age? So if people don't know about the services and features and products that are accessible, it's just as if they were never made

available at all.

If we let ourselves live at the abstract level of oh yeah, it's in there somewhere, we haven't really performed the public service that I think we want to perform.

It would be great if the only people who lacked information were the consumers. But in point of fact, those of us who have worked with industry over the years recognize that industry has its own, you know, I don't know what I don't know to channel the Secretary of Defense.

By the way, he's still Secretary of Defense. I haven't checked the news this morning. But industry very often doesn't know what it doesn't know about accessibility.

And they recognize that, and they are willing to learn. But, again, those of us who have worked with industry over the years, find the irony that just when we've managed to train up the right staffer, in the right job, in the right company, there's some turn, there's some re-engineering, a re-org.

Or that person retires or finds, imagine it, a better job than working on accessibility within that company. And so we begin the process all over again.

So there is an organizational ignorance, or a lack of organizational memory in large mainstream companies that occurs.

And we see it going on now with, you know, large scale retirements. We have lost many of our accessibility champions and technology experts within mainstream companies.

So that's an issue that we have to resolve somehow, not by locking people into their jobs, but figuring out some way to make sure that information reaches the right people in industry at the right moment.

Policy makers also have their own areas of ignorance. And I will leave that sentence without any implications. And again, to focus on outcomes, for a political environment that focuses so much on market realities, this is an area where I think it is highly justified.

But it's an area where ignorance is endemic. What do we know about TTY users as a market? What do we know about relay users as a market? What do we know about screen-reader users as a market?

Both the current users and the potential users, we hardly know anything about them. We wind up using anecdotal experience, oh so and so now has a

Blackberry, and they're not using their TTY anymore.

I guarantee that that's true. What percentage of the adoption curve, if you think of the innovators and early adopters, what percentage have already moved and migrated away from some of the legacy equipment and into two-way text, and text over IP, and what have you?

And what percentage have been left behind, and maybe left behind if we don't take some concerted social policy action? It's almost enough to get you to believe in the existence of a digital divide, if we didn't know better.

I'd like to sort of end this dreary exposition with a little bit of hope. We do see companies that are actively reaching out to understand what consumers' needs are, and to get beyond just the anecdote level, or the assumption level, actually doing primary market research on customers with disabilities, fantastic stuff.

We find advocacy organizations doing the same kind of work, asking their members what you use, why did you change what you used to us? And as a final point, I want to emphasize the initiative taken on by the Alliance for Telecom Industry Solutions, which is an industry body that coordinates information

for the sake of manufacturers and telecom carriers, etcetera.

It is now moving towards the establishment of a telecom accessibility council based on its experience with stake holders from the disability communities, researchers, policy makers, and people in industry.

This is a new initiative. And we have already talked to most of the industry stake holders in the room. If you'd like to follow up on it, get information, you can find information about it on the website that we distributed about, or at atis.org. Thank you.

DR. PEPPER: Thank you very much. Thanks Jim. Our final speaker on the panel before we open it up is Nate Wilcox. Nate is the Systems Administrative for the Vermont Enhanced 911 Program.

The program oversees a multiple public safety answering point, PSAP, system. And it was recently used as a benchmark system for the report card to the nation on 911 that was presented to congress a couple of years ago.

Nate is the Chair of the Voice Over IP Packet Technical Committee of NENA, which is the National Emergency Number Association. And he is

recognized as an industry leader for Voice Over IP technical advancements within the 911 community.

And I have met Nate at multiple Voice Over IP meetings. And I know that he has been working, and his group has been working, very, very hard. And I'm glad Nate that you are here as a 911 person, because you have already hear multiple people talk about the importance of E911, 911, not just in and of itself, but particularly for people with disabilities. So, Nate?

MR. WILCOX: Thank you Bob. And I am absolutely glad to be here. I was not able to make the E911 summit we had last time here at the FCC. My boss was here, Evelyn Bailey.

And she generally talks within that arena. However, I am here to talk about good things within 911. I have good news. Because all I have heard so far this morning really is that there's a true barrier, right, to 911, and in particular for the disabled community.

So I have good news. I am here to talk on behalf of the small and overworked group of dedicated 911 individuals within the 911 community that are working to enable IP connectivity within the 911 PSAP nationwide.

Not only nationwide, but on a global effort. And we are finally seeing the light of day from those efforts that we have been undertaking for about three years now, because of the adoption of consumer VoIP services and the recognition now.

That's not to say that we're not still in the requirements of analysis stage. So clearly what's brought out from you folks will be brought back into the design of the new 911, the future 911, which will be wholly VoIP enabled, is the thought process.

So what needs to happen -- it's a paradigm shift -- we have to think differently within 911. And along those lines, I'm going to talk about challenges that we are facing, and some of the solutions that we envision to those challenges.

A lot of those challenges that we're facing in 911 are challenges that are similar across the board for 911. They impact everybody, regardless of who uses the VoIP phone or that mode of connectivity, it impacts everybody.

I'm also going to provide some solutions. So I was a little confused as to what lies truly beyond. It seems like 911 always winds up on the challenges side of it.

But really there's some opportunities there

as well that we can certainly provide. I will talk about nomadic user, nomadic VoIP users. I will talk about TTYs and some of the challenges there.

I will talk about the lack of a standardized approach to IP communication enhancements. And I will hit on QoS on an end-to-end IP communication system where 911 is at one end and the consumer VoIP user is at the other end.

And then I will talk a little bit about what's going on right now within this arena. So nomadic VoIP users, these are the guys that take the 8x8 telephone adapter to their hotel room, plug it in, and they get phone service, okay.

Within 911 we count on the user without considering wireless or sedative callers to be stationary. They are at the end of a pair of wires, and we always know where they are.

And they will always have the same address. The process for validating that location information takes about 24 hours with the phone company. So when I get my new phone service, 24 hours later, my location information is validated through a process.

The problem with VoIP is now I can take my telephone adapter, plug it into an Ethernet connection anywhere, and have a location information. But I have

to go through the 24 hour period of having that location information validated, which by the way hasn't been enabled for Voice Over IP yet.

And one of the serious benefits of VoIP is to be able to take that telephone adapter with me back and forth to the office, have the same number at the office as I do at home.

So, I'm clearly breaking the 24 hour rule right away. So what we have to do is we have to create a paradigm shift for broadband service providers, those folks that provide the IP services to be able to validate that location information in advance before I ever plug in my telephone adapter.

That's a paradigm shift that needs to occur for nomadic VoIP users. TTYs, I think we all are pretty familiar on some of the negative impacts on TTYs when you start to use them over Voice Over IP or IP-enabled circuits.

The reality is that the total character error rate for TTYs could create a situation in which dropped packets, which is normal within an IP network, you know, packet loss is normal.

IP communications on the whole are designed to preserve bandwidth. And part of that preservation is packet loss. So those dropped packets can actually

drop control characters.

We all know that. They can actually drop TTY conversations all together, immediately. It's not a great situation to be in for the 911 call takers, certainly not a great situation to be in for the TTY user who is relying on these communications to continue.

So the paradigm shift for TTYs, we need to ensure a compressionless as possible compressionless codec that's used for 911. And I have G.711 up there as an example.

It seems to work well for TTYs. There are others out there as well. We need to promote technologies that improve through-put, and use of alternate communication methods as well to provide TTYs.

I'm talking about SMS, two-way paging, real-time text messaging, those types of communications. So that's a shift that needs to occur within that arena.

The lack of a standardized approach, I recognize the fact that instant messaging, chat sessions, and other modes of communication are catching on more and more within the disabled community.

And clearly the need has to be that that should be supported at the PSAP site, at the Public Safety Answering Point. It is unofficially supported now.

If you walk into a PSAP, nine times out of ten, a lot of those call takers are already using chats and instant messaging for their coworkers and family.

So, unofficially, it is supported. Officially it needs to be adopted, right? Full streaming video isn't supported, and simply because IP connectivity within PSAP is not inherent.

So we need to create a platform that calls for a standardized approach to all these technologies. And we need to migrate this capability not only to the 911 PSAP, but beyond to the emergency responders as well, so they can participate in any of this information that's coming into the PSAP environment.

Quality of service, I'm not going to go over that too much. Clearly background noises and other elements associated with Voice Over IP can create problems for 911 calls.

So, in that regard, the paradigm shift is to provide and support better technologies to support that. So what's being done? And I've got maybe ten

seconds left here.

The National Emergency Number Association has been working, as I mentioned, through both the technical and operation side of the house these issues.

We have several folks involved within the process, including folks from within the ITF and other organizations similar to that. Our plan is to gain ANSI accreditation for the standards that come out of that effort.

And, like I said, we are at the requirements analysis phase. So there is plenty of opportunity for more input there. We are looking at an immediate solution for Voice Over IP which will not provide nomadic or mobile support to be available this month.

In fact, the standard is written. An analogous solution for current 911 processes, including the ability to locate nomadic callers will be done by the end of they year.

But the real cool product, which will bring IP into the PSAP, which is the native end-to-end VoIP with ongoing support for communications at all levels will begin later this year to be completed, we hope, by mid year, next year. Thanks.

DR. PEPPER: Thank you Nate. That actually